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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/051,230	01/22/2002	Shinichi Kawamura	218335US0CONT	8868

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EXAMINER

RODEE, CHRISTOPHER D

ART UNIT PAPER NUMBER

1756

DATE MAILED: 01/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/051,230

Applicant(s)

KAWAMURA ET AL.

Examiner

Christopher D RoDee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-20, 22, 23, 31-33, 35, 37-39 and 41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-20, 22, 23, 31-33, 35, 37-39, and 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12 December 2003 has been entered.

Election/Restrictions

Applicant's election with traverse of group II and the structural units having charge transportability as those of polycarbonate #1 (p. 90) in Paper No. 3 is acknowledged. The restriction and election remain in effect for the reasons given in the prior Office actions. The requirement is still deemed proper and is maintained as FINAL. Claims 1-16 (Group I) and claims 25-30 (Group III) have been canceled. The elected species is found allowable for the claims as now defined, except for claim 37 and those claims dependent. These latter claims do not limit the mole percent of the structural unit having charge transporting properties or the unit of the formula (2) as is presented for the other claims. For claims 17, 19, 22, 31, 33 and 35 the generic claim (i.e., generic polycarbonate) is now examined because the elected species has been found allowable where restricted to the specific mole percentages recited.

Claim Objections

Claims 18, 20, 23, and 32 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is

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required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Each of these dependent claims specifies a percentage of the structural unit having charge transporting properties of 10 to 90 weight percent. These values appear to be outside the scope of independent claims which specify a weight of 58 to 60 mole percent of the structural unit having charge transporting properties. See section 112, second paragraph, rejection below.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17-20, 22, 23, 31-33 and 35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Each of the rejected independent claims specifies a mole percentage of certain structural units based on the total weight of the polycarbonate. This reference is indefinite and confusing because a "mole" refers to the number of units (atoms, molecules, structural units, etc.) in a substance while "weight" refers to the physical mass of the material. The number of units does not define a weight. A suitable amendment is suggested to clarify this issue. The claims have been examined based on the mole percentages defining the number of units present in the polycarbonate.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 18, 20, 23, 32, 37-39 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikuno *et al.* in US Patent 5,871,876 in view of Tanaka *et al.* in US Patent 5,976,746 and further in view of common knowledge in the art.

This rejection was originally set forth in the Office action of 24 April 2002 and is reiterated below for completeness. Claims 18, 20, 23, and 32 are rejected given their specific recitation of the broader amounts of structural unit having charge transporting properties than as present in the independent claims.

Ikuno discloses an electrophotographic photoconductor comprising a photosensitive layer having a polycarbonate. The polycarbonate is given by the formula (I) (cols. 3 and 37) having "k" units containing a triaryl amino in the side chain and "j" units. The formula has 0.1 to 1 "k" units and 0 to 0.9 "j" units. In this formula Ar¹, Ar², and Ar³ are each an arylene group and R¹ and R² are aryl groups which may have a substituent. An exemplified triaryl amino-containing unit is present in Example 1 where each Ar group is phenylene and each R group is p-methylphenyl. Also in the formula (I), the "X" unit may be a bivalent group given by the formula (Ia), where "Y" is oxygen and the substituting "R" groups may be alkyl. Specific "j" units are derived from monomers such as 4,4'-dihydroxydiphenoxide (col. 6, l. 27). The reference also discloses other charge transporting units such as those having the triaryl amino group in the backbone of the resin (formula (VII); col. 15).

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The primary reference does not identically disclose the claimed, elected polymer given on specification page 90, but provides substantial guidance to the artisan to select units as claimed from the disclosure.

Further motivating the selection of the formula (Ia) as the repeating unit where X is oxygen is the disclosure of Tanaka, which presents photoconductors with charge transporting polymers in the photoconductive layer. These charge transporting polymers are similar to the polycarbonates given in Ikuno by the formula (VII). This reference discloses repeating units of the formula (2), which correspond to the "f" units in Ikuno. Tanaka discloses useful monomers for forming these units in columns 116 and 117, and includes 4,4'-dihydroxydiphenyl ether (the same as 4,4'-dihydroxydiphenoxide) and 4,4'-dihydroxy-3,3'-dimethyldiphenyl ether (col. 116, l. 44,45).

The primary reference does not disclose the specific means of the claimed process cartridge. The Examiner takes Official Notice that the claimed process cartridges are known to have electrophotographic photoconductors capable of forming an electrostatic latent image. This Official Notice was originally taken in the Office action of April 2002 and was not challenged by applicants. Typical embodiments of process cartridges are Laser Printers, which are commonly used in office settings.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use 4,4'-dihydroxy-3,3'-dimethyldiphenyl ether as the reactant for the "f" units in Ikuno because Ikuno discloses that 4,4'-dihydroxydiphenyl ether units (the same as 4,4'-dihydroxydiphenoxide) are useful and suggests substituting alkyl groups on the phenyl rings. The supporting Tanaka reference discloses that 4,4'-dihydroxydiphenyl ether and 4,4'-dihydroxy-3,3'-dimethyldiphenyl ether are alternatives for each other in the formulation of polycarbonates having triarylamine charge transporting groups. Because the respective ether

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groups are known alternatives for charge transporting polycarbonate resins and because both ether groups fall within the general formula (I-a) in Ikuno, the skilled artisan would have found it obvious to use either group in the polycarbonate of Ikuno with the expectation of success in a photoconductive layer. The artisan would also have found it obvious to use the exemplified triarylamine unit in Ikuno because this reference teaches that this unit will provide required charge transport functionality. The artisan would have found it obvious to use amounts of the "k" units and "j" units within the scope of Ikuno's teaching of 0.1 to 1 "k" units and 0 to 0.9 "j" units and particularly values near equal amounts because Ikuno Example I uses equal amounts of each unit. As no other units are necessary the reference is seen as suggesting the consisting essentially of language of the instant claims.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the obvious photoconductor suggested by Ikuno in view of Tanaka in a well known process cartridge because these devices are useful to automate the production of images in both office and home settings.

The remarks submitted in the recent response have been considered but because the claims are not limited to those specific amounts of structural units argued, the claims remain rejectable for the reasons of record (e.g., see Office action of December 2002).

Claims 17 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikuno *et al.* in US Patent 5,871,876 in view of Tanaka *et al.* in US Patent 5,976,746 and further in view of common knowledge in the art.

Ikuno discloses an electrophotographic photoconductor comprising a photosensitive layer having a polycarbonate. The polycarbonate is given by the formula (II) (col. 6, l. 35) having "k" units containing a charge transporting unit in the side chain and "j" units. The formula

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has 0.1 to 1 "k" units and 0 to 0.9 "j" units. In this formula Ar^4 , Ar^5 , and Ar^6 are each an arylene group and R^1 and R^2 are aryl groups which may have a substituent. An exemplified polycarbonate according to this formula is present in Example 2. In the formula (II), the "X" unit may be a bivalent group given by the formula (Ia), where "Y" is oxygen and the substituting "R" groups may be alkyl. Specific "j" units are derived from monomers such as 4,4'-dihydroxydiphenoxide (col. 6, l. 27). The reference also discloses other charge transporting units such as formula (III) - (VIII) which are similarly applicable to the instant claims. Note Examples 3-8 as applicable to the instant claims. The Examples appear to show equal amounts of the respective units in the polycarbonate, equating to a 50/50 mole percent copolymer.

Further motivating the selection of the formula (Ia) as the repeating unit where X is oxygen is the disclosure of Tanaka, which presents photoconductors with charge transporting polymers in the photoconductive layer. These charge transporting polymers are similar to the polycarbonates given in Ikuno by the formula (VII). This reference discloses repeating units of the formula (2), which correspond to the "j" units in Ikuno. Tanaka discloses useful monomers for forming these units in columns 116 and 117, and includes 4,4'-dihydroxydiphenyl ether (the same as 4,4'-dihydroxydiphenoxide) and 4,4'-dihydroxy-3,3'-dimethyldiphenyl ether (col. 116, l. 44,45).

The Examiner takes Official Notice that electrophotographic apparatuses having the recited means and process cartridges are exceedingly well known in the electrophotographic art. The same Official Notice was taken in the prior Office actions without challenge by applicants.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use 4,4'-dihydroxy-3,3'-dimethyldiphenyl ether as the reactant for the "j" units in Ikuno because Ikuno discloses that 4,4'-dihydroxydiphenyl ether units (the same as 4,4'-

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dihydroxydiphenoxide) are useful and suggests substituting alkyl groups on the phenyl rings. The supporting Tanaka reference discloses that 4,4'-dihydroxydiphenyl ether and 4,4'-dihydroxy-3,3'-dimethyldiphenyl ether are alternatives for each other in the formulation of polycarbonates having triarylamine charge transporting groups. Because the respective ether groups are known alternatives for charge transporting polycarbonate resins and because both ether groups fall within the general formula (I-a) in Ikuno, the skilled artisan would have found it obvious to use either group in the polycarbonate of Ikuno with the expectation of success in a photoconductive layer. Given the disclosure of equal molar amounts of each unit in the polycarbonate, the artisan would have motivation to produce polycarbonates having molar ratios near this 50/50 combination, such as 60/40, as he/she optimizes the polycarbonate to give the wear resistance (col. 36) discussed by Ikuno.

The evidence in the specification has been considered but is not persuasive for the scope of the claims because it is all directed to either the elected species, which has been found allowable, or to polycarbonates outside the scope of the claims (see Polycarbonate Resin No. 2, p. 91). The evidence is thus not commensurate in scope with the instant claims.

Allowable Subject Matter

Claims 19, 22, 33, and 35 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher D RoDee whose telephone number is 571-272-1388. The examiner can normally be reached on most weekdays from 6 to 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.

cdr
15 January 2004


CHRISTOPHER RODEE
PRIMARY EXAMINER